fore, several incredibly high ascensions have been made at sea from the deck of steam vessels at the command of Teisserenc de Bort. The ability to direct the speed and motion of the vessel to give the best conditions for the flight of the kites constitutes a decided advantage over ascensions made on land from stationary reels, etc.

In the German ascension the note states that six kites were employed having an aggregate area of 323 square feet, and that 47,572 feet of wire (about 9 miles) were suspended in the air.

The size or sizes of the wire employed, the form and structural details of the kites, and their dispositions on the line, together with data in regard to the average tension of the wire, all constitute important details of this distinct engineering achievement that would be highly interesting to aeronautical students. None of these are given in the note referred to, but it is hoped that they will appear in due time in the reports of the observatory.

THE RAINFALL OF CHINA AND KOREA.

By T. OKADA.

[Reprinted from the Journal of the Meteorological Society of Japan, Vol. 24, No. 9, September, 1905.]

[The east coast of Asia must have many climatal analogies with the east coast of North America, but our actual statistical knowledge of the subject has become possible only through the exertions of meteorologists during the past twenty years. On account of the efforts made by the Department of Agriculture to introduce into the United States many of the important plants of China it becomes doubly necessary that we make a complete study of the climate, especially the rainfall and temperature of these two countries. We therefore have received with great pleasure an important article by T. Okada, published in the Journal of the Meteorological Society of Japan for September, 1905, vol. 24, No. 9, and reprint it herewith, with the addition of an outline map, on which we have entered the annual rainfall figures, but without drawing isohyetal lines, since the figures relate to special groups of years and have not yet been reduced to the fundamental interval, owing to the sparseness of the data. It will, however, be seen that we have here a good general idea of the rainfall along the immediate coast line between latitudes 20° and 40° north.—*C. A.*]

RAINFALL TABLES FOR CHINA AND KOREA.

I. *Introductory.*—Since the publication of Dr. Fritsche's admirable treatise on the climate of eastern Asia, contributions to the knowledge of the climate of China, especially in connection with the rainfall, have been made by several authorities, as Thirrling, Hann, Supan, and Doberck. Among others Professor Supan collected the results of pluviometric observations made at Chinese light-houses and custom-houses, together with those taken at the Peking, Zikawei, and Hongkong meteorological observatories, and published the result of his elaborate discussion in the well known Petermann's Geographische Mitteilungen. This monograph by the German geographer is indeed the most complete of all the similar works that we have at present. But since the publication of that memoir several years have elapsed, and we can now obtain a several years longer mean of rainfall at some forty stations in eastern China and the Korean Empire, instead of the six years' mean at a smaller number of stations from which Professor Supan has drawn his conclusions on the pluviometric conditions of the vast celestial empire. It may not, therefore, be needless duplication to publish here a collection of the more recent observations for the ten years from 1892 to 1901.

The materials used are the rainfall tables given in the successive volumes of the excellent bulletins of the Observatoire Magnétique et Météorologique de Zikawei for the years from 1892 to 1901. These tables contain only daily sums of precipitation at some thirty stations on the coasts of China and Korea, which include custom-houses, light-houses, and meteorological observatories. We have, therefore, enumerated the number of days with rain, and extracted the greatest daily rainfall for each month from the tables. The data for Tintau, Wei-hai-wei, and Foochow are taken from other sources. Rainfall tables for China, published by Doctor Doberck in the early numbers of the Quarterly Journal of the Meteorological Society, and reports of Hongkong Observatory were also consulted.

2. *Annual rainfall.*—We give in Table 1 the mean annual rainfall at thirty-seven stations in China and three stations in Korea. Most of these stations are situated on the coasts or on the neighboring islands, and only a few stations have continental situation, so that our data are professedly insufficient for the study of geographical distribution of rainfall throughout the empire. The mean annual rainfalls here given are mostly deduced from the ten years' observations, and only a few of them refer to measurements of shorter duratation. But we have abstained from reducing the latter to the corresponding 10-year mean as is usual in pluviometric investigations, simply because we have not sufficient data to do so.

TABLE 1.—*Annual rainfall.*

Stations.	Latitude.		Longitude.		Annual rainfall.
	°	′	°	′	*mm.*
Peking	39	57	116	28	675.9
Wonsan	39	9	127	33	1138.1
Houki	38	4	120	39	423.2
Chefoo	37	34	121	32	582.6
Chemulpo	37	29	126	37	905.2
Shangtung Cape, NE	37	24	122	42	536.1
Shangtung Cape, SE	37	24	122	42	671.9
Wei-Hai-Wei	37	10	122	10	535.5
Tintau	36	4	120	18	682.6
Fusan	35	5	129	6	1136.3
Chinkiang	32	12	119	30	1041.8
Shaweishan	31	25	122	15	934.5
Wuhu	31	22	118	22	1017.9
Zikawei	31	12	121	21	1009.7
North Saddle	30	52	122	40	746.7
Gutzluff	30	50	122	10	823.8
Hankau	30	33	114	20	1276.1
Ichang	30	12	111	19	1059.3
Steep Island	30	12	122	36	848.6
Ningpo	29	58	121	44	1375.3
Kiukiang	29	44	113	48	1326.4
Chunking	29	31	104	11	979.5
Wenchow	28	0	120	35	1501.1
Pagoda	26	8	119	38	1208.6
Middledog	25	58	120	2	1114.9
Tournabout	25	26	119	56	1001.5
Ockseu	24	59	119	28	886.9
Amoy	24	27	118	4	1073.0
Chapel Island	24	10	118	13	813.0
Wuchow	23	29	111	20	1111.5
Swatow	23	20	116	43	1460.6
Lamocks	23	15	117	18	1001.0
Canton	23	7	113	17	1292.5
Breakerpoint	22	56	116	28	1549.6
Longchow	22	22	106	45	1010.1
Hongkong	22	18	114	10	2005.0
Macao	22	11	113	33	1615.5
Waglan	22	10	113	30	1209.9
Pakhoi	21	29	109	6	1979.9
Kiungchow	20	3	110	20	1288.1

In northern China the amount of rainfall is generally below 100 centimeters, as in our Hokkaido (Japan). The provinces of Shangtung are peculiarly liable to drought, with consequent severe famine. But the valley of the Yangtsekiang and southern China are wet and fertile. In general, the annual rainfall decreases from the south to the north; thus Pakhoi, in the Gulf of Tonking, has 188 centimeters of rainfall; Foochow, 121 centimeters; Zikawei, 101 centimeters; Shangtung promontory, 91 centimeters; and Peking, 68 centimeters. The annual rainfall also decreases from the coast toward the interior of the empire. This can be clearly seen from the observations made at the rain gage stations in the valley of the Yangtsekiang. Thus Chinkiang has 104 centimeters of yearly rainfall, Wuhu,

FIG. 1.—Rainfall of the Chinese and Korean coasts.

102 centimeters; Kiukiang, 133 centimeters; Hankau, 106 centimeters; Ichang, 98 centimeters; and Chonking, 98 centimeters.

In China the annual rainfall is subject to very large fluctuations, as Professor Supan has already remarked. In the northern portions of the empire this is especially the case, but it may be also observable in central China. In the following table are given the series of annual rainfalls for Peking, in northern China, and Hankau, in central China.

In Korea the annual rainfall is about 90 centimeters on the west coast, while it is generally above 100 centimeters on the east and south coasts. Thus there is a marked difference on both sides of the central mountain ranges which constitute the backbone of the peninsular empire.

Annual rainfalls in northern and central China.

Year.	Peking.	Hankau.
	mm.	*mm.*
1890....	992	148.0
1891....	169	116.1
1892....	868	1298.0
1893....	1034	1407.8
1894....	1009	1318.3
1895...	370	923.2
1896....	684	1517.1
1897....	674	1503.4
1898....	557	1130.3
1899....	351	1355.0

3. *Annual periods.*—In China the annual variation is very pronounced, and we may distinguish two different types of

variation; that is to say, the northern type and the southern type. In northern China, where the northern type of rainfall predominates, the rainfall mostly occurs in July or August, while February is the driest month. The summer is very wet and productive, while the winter is dry and cold. Most of the annual rainfall occurs during the summer and only a small part in the winter. In southern China the wettest month is June and the driest is December.

In Korea there are also two types of variation. In the northern part of the empire we have the greatest monthly rainfalls in August and the least in December, January, and February. In the southern part June has the most plentiful rainfall and February the least.

We give in Table 2 the observed mean monthly rainfalls for each station, without correction for the unequal length of the months.

TABLE 2.—*Mean monthly rainfall.*

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm*	*mm.*	*mm.*	*mm.*	*mm.*
Peking	3.7	5.3	11.8	30.8	22.8	166.3	287.0	127.4	46.0	16.4	9.2	2.1
Wonsan	39.4	24.6	47.5	57.4	54.0	127.8	189.5	248.2	228.7	61.2	44.7	15.1
Houki	2.7	1.4	8.3	22.5	30.2	52.6	122.9	110.5	32.9	21.5	12.7	5.0
Chefoo	9.2	4.3	10.3	18.9	22.3	51.4	183.9	179.3	40.1	22.6	24.2	16.1
Chemulpo	26.4	19.1	25.2	68.1	64.7	140.1	166.8	181.9	113.3	33.7	42.1	23.8
Shangtung Cape, NE.	8.5	5.1	13.5	36.8	26.4	62.2	103.0	161.5	55.4	24.5	28.2	11.4
Shangtung Cape, SE.	11.9	7.4	21.2	45.4	43.8	85.0	124.8	199.9	58.9	23.0	33.5	17.1
Wei-Hai-Wei	13.7	9.5	21.0	16.2	24.0	52.7	126.5	100.7	63.7	63.5	10.5	33.5
Tintau	6.5	7.5	40.0	43.3	44.2	52.1	175.6	184.5	39.5	53.8	7.7	27.9
Fusan	21.1	45.5	48.7	123.4	106.7	213.0	138.1	154.7	164.6	52.2	45.2	23.2
Chinkiang	52.7	37.7	88.6	78.5	105.5	161.6	195.9	118.1	101.2	30.3	42.1	29.6
Shaweishan	51.8	44.4	73.5	87.6	106.6	122.0	83.6	120.9	137.9	45.7	47.6	12.9
Wuhu	57.1	45.0	97.6	106.7	108.9	145.0	157.0	90.7	84.0	51.9	44.1	29.9
Zikawei	54.7	43.1	90.8	89.2	105.6	135.0	127.8	140.2	88.7	67.6	44.5	22.5
North Saddle	50.7	44.0	78.4	78.7	86.8	105.8	48.5	51.1	79.6	47.5	54.4	21.2
Gutzluff	52.3	42.6	90.1	94.5	60.8	98.6	69.0	71.9	114.2	58.6	46.9	24.3
Hankau	48.0	46.6	104.4	159.7	194.0	220.4	206.2	73.5	81.3	65.9	40.0	36.1
Ichang	15.4	26.4	51.6	122.2	131.6	122.6	181.4	175.1	114.0	74.8	26.5	17.7
Steep Island	57.7	51.4	93.0	98.6	92.4	123.8	60.5	69.8	66.2	62.0	46.2	27.0
Ningpo	80.6	84.9	108.3	127.1	121.3	186.1	118.7	147.9	188.9	130.2	51.6	29.7
Kiukiang	67.8	66.9	137.3	162.3	175.0	209.1	150.7	82.3	108.8	93.2	39.6	33.4
Chunking	13.7	22.3	36.1	107.2	140.0	145.8	122.4	90.6	126.3	102.3	53.3	19.5
Wenchow	59.6	97.3	121.4	14.8	174.1	254.9	124.5	196.2	130.0	111.2	59.3	22.9
Pagoda	55.2	99.8	91.7	125.6	135.4	176.1	143.5	104.2	171.8	54.4	32.0	18.9
Middledog	72.4	100.2	98.9	139.6	110.6	179.9	40.5	118.2	48.0	115.6	59.7	31.3
Tournabout	51.9	72.9	94.3	116.9	18.3	232.8	50.5	117.0	71.1	92.5	46.8	36.5
Ockseu	35.9	62.1	77.9	91.4	147.6	149.7	60.1	107.9	69.7	52.0	19.9	12.7
Amoy	33.2	75.5	69.6	95.1	176.0	164.4	114.1	153.8	81.7	54.9	36.9	17.8
Chapel Island	25.7	65.1	52.2	17.8	136.8	142.7	70.8	139.7	57.3	67.2	22.0	15.7
Wuchow	24.2	30.4	77.9	202.3	187.4	150.5	161.4	127.1	127.1	6.3	10.8	6.1
Swatow	38.0	86.3	53.5	109.1	246.4	279.7	157.1	188.7	148.2	91.9	44.4	17.3
Lamocks	27.7	42.1	34.0	72.2	145.0	176.2	118.3	174.8	117.2	58.2	23.6	11.7
Canton	17.1	15.2	66.0	172.0	227.1	311.2	151.5	163.9	110.9	47.3	2.7	7.6
Breakerpoint	31.2	58.5	34.5	102.7	206.0	297.0	175.6	310.9	156.3	109.2	48.7	19.0
Longchow	17.5	20.3	63.2	101.9	147.6	145.9	146.4	259.1	46.9	32.1	23.9	5.3
Hongkong	27.6	49.3	33.8	97.8	234.8	371.4	283.7	304.6	215.0	173.8	55.2	15.8
Macao	79.4	70.1	21.8	127.7	331.5	34.7	239.6	219.9	251.7	157.4	63.5	18.2
Waglan	31.2	41.2	36.2	56.0	146.4	318.4	140.0	224.0	105.7	73.4	31.2	6.2
Pakhoi	22.5	38.4	53.1	71.1	172.2	306.5	571.2	438.2	174.0	60.7	47.1	24.9
Kiungchow	9.2	16.2	28.2	153.9	156.0	226.3	220.0	194.8	140.1	46.1	54.7	42.6

4. *Number of rainy days.*—By "days with rain," as here given, is meant days on which the precipitation amounts to 0.1 millimeter or more. From some climatological points of view such a slight fall would be of little importance, but we have adopted the usual mode of counting the days with precipitation in order to be able to make a strict comparison with those in Japan and neighboring countries.

The number of rainy days is greatest on the coast from Foochow to Shanghai, and decreases thence toward the north and south. On the average, the coast of central China has 120 days of precipitation, southern China 80 days, and northern China 60 days.

Rainy days are generally numerous during the warmer seasons and scanty in the colder seasons. The difference between the two seasons is very remarkable in northern China. In central China and the valley of the Yangtsekiang, however, the rainy season begins in April and continues to June, as in Japan proper, where the rainy period, in the early summer, is commonly known as the "season of the plum rain," so called because then the plums are getting ripe. In Korea the number of rainy days is greatest on the west coast and least on the northeast coast. Thus, Chemulpo has 84 rainy days in a year, Fusan 76, and Wonsan 64. The rainy days are generally more numerous in summer than in winter.

Table 3 contains the average number of rainy days for each month and for the year.

TABLE 3.—*Average number of rainy days.*

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Peking	2	4	4	4	6	8	14	13	7	4	3	2	71
Wonsan	3	2	6	4	4	6	11	11	8	4	3	2	64
Houki	2	1	3	3	3	4	6	6	4	4	2	2	40
Chefoo	4	2	4	2	3	5	7	11	4	4	4	7	57
Chemulpo	5	4	6	7	6	9	12	13	7	4	5	6	84
Shangtung Cape, NE	4	1	2	3	3	5	6	6	4	3	4	2	43
Shangtung Cape, SE	3	2	4	4	4	6	7	7	4	3	4	4	52
Wei-Hai-Wei	6	3	5	5	4	8	8	8	5	6	4	9	71
Tintau	4	2	5	5	8	8	12	12	7	6	4	6	79
Fusan	3	4	6	8	8	9	10	8	8	4	4	4	76
Chinkiang	8	6	9	9	10	9	11	8	9	4	4	6	93
Shaweishan	7	7	8	8	8	8	6	5	6	4	4	3	74
Wuhu	8	7	11	9	10	7	8	7	8	5	4	6	90
Zikawei	11	11	14	13	12	13	11	11	13	9	6	7	131
North Saddle	7	7	9	8	9	8	4	3	6	4	5	5	75
Gutzluff	6	6	8	8	6	7	4	6	5	4	4	3	67
Hankau	8	6	11	11	11	8	8	6	8	6	4	5	92
Ichang	5	5	9	10	11	9	10	11	10	8	6	4	98
Steep Island	8	7	9	8	8	8	5	6	6	6	4	4	79
Ningpo	10	11	14	14	12	12	9	9	12	9	6	6	124
Kiukiang	9	9	13	13	13	11	7	7	8	7	4	5	106
Chunking	7	8	10	13	14	14	10	8	14	17	11	8	134
Wenchow	11	12	17	16	18	15	10	12	12	9	8	5	145
Pagoda	9	13	11	10	12	11	6	7	10	7	6	4	106
Middledog	9	13	12	11	10	9	4	7	10	12	7	6	110
Tournabout	8	9	9	9	8	8	3	6	6	8	6	4	84
Ockseu	6	8	8	8	8	8	1	7	3	3	4	3	70
Amoy	7	11	9	11	11	11	9	10	6	4	5	3	97
Chapel Island	5	8	6	7	7	7	4	7	4	3	4	3	65
Wuchow	7	7	10	13	12	12	13	11	6	4	4	3	102
Swatow	6	10	10	10	12	15	13	13	8	5	5	4	111
Lamocks	4	6	4	6	7	10	7	9	5	4	4	2	68
Breakerpoint	4	8	5	6	9	12	10	12	7	7	4	3	87
Longchow	6	8	12	14	11	11	12	13	7	5	4	4	107
Hongkong	10	10	11	13	16	21	20	18	12	9	5	4	149
Macao	8	8	5	7	12	14	14	14	13	7	4	4	110
Waglan	5	5	6	5	6	14	10	13	9	5	3	2	83
Pakhoi	8	11	12	9	10	14	18	17	11	5	4	4	123

5. *Greatest daily rainfall.*—In China heavy rainfall is a rather rare phenomenon, and such abundant downpours of rain as we often experience in this country (Japan) occur very rarely in the celestial empire. But falls of 100 millimeters in 24 hours are not rare, and most of these heavy falls occur during the four warmer months from April to August. We give here the dates of some of the heavy rainfalls, leaving further instances to the general Table 4:

Stations.	Amount.	Date.
	mm.	
Tournabout	363.3	June 6, 1894.
Breakerpoint	360.2	May 22, 1893.
Tournabout	292.2	September 8, 1892.
Swatow	270.7	May 23, 1893.
Wuchow	252.3	May 22, 1893.
Tournabout	213.4	May 19, 1895.
Breakerpoint	219.3	October 7, 1894.
Breakerpoint	208.3	August 11, 1897.
Ockseu	200.7	September 8, 1892.

In Korea heavy rainfall seldom occurs. A fall of more than 100 millimeters is a rare phenomenon. We have only a single instance of a heavy rainfall of more than 200 millimeters. The following table contains the greatest rainfalls of more than 120 millimeters observed at Fusan, Chemulpo, and Wonsan:

Stations.	Amount.	Date.
	mm.	
Wonsan	382.5	September 4, 1893.
Fusan	168.0	September 22, 1899.
Wonsan	164.6	September 6, 1901.
Fusan	129.0	June 25, 1898.

64——2

TABLE 4.—*Greatest daily rainfall.*

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Peking	7.3	2.3	6.2	42.5	16.6	148.5	154.0	86.3	59.3	30.6	11.5	3.0
Wonsan	40.0	30.0	39.8	61.7	52.1	83.0	119.8	114.5	382.5	94.7	56.9	19.7
Houki	18.2	10.2	20.3	45.9	55.9	81.3	177.5	166.5	96.6	41.9	27.9	12.4
Chefoo	15.0	14.0	26.7	40.7	23.8	66.6	105.5	110.0	69.9	46.2	40.1	22.3
Chemulpo	38.1	29.2	19.0	63.4	45.7	87.6	108.0	106.7	104.3	43.3	44.5	15.2
Shangtung Cape, NE	26.2	22.9	24.4	55.9	22.9	78.7	74.7	141.2	88.8	53.3	44.1	27.9
Shangtung Cape, SE	28.7	16.0	27.9	48.3	59.4	78.5	104.7	115.5	96.9	36.6	45.0	17.5
Tintau	7.3	12.3	55.5	32.5	40.2	39.7	116.3	152.5	40.0	132.6	13.1	21.9
Fusan	39.0	89.5	36.5	79.0	83.5	129.0	87.0	118.0	168.0	96.0	52.0	46.0
Chinkiang	40.1	42.8	52.7	59.1	68.6	146.2	182.7	80.7	78.7	65.3	49.3	23.8
Shaweishan	44.5	30.9	37.6	60.8	50.8	60.8	55.5	127.0	120.7	83.8	73.8	16.5
Wuhu	31.0	40.6	45.7	44.5	51.4	78.2	136.7	62.0	60.8	50.0	54.7	26.0
Zi-ka-wei	55.8	24.6	34.9	57.0	54.1	135.6	76.4	113.2	68.7	53.3	49.2	24.1
North Saddle	38.1	23.9	33.5	55.1	65.6	74.9	47.4	85.3	90.8	84.4	47.6	19.0
Gutzluff	45.7	27.9	48.7	45.8	38.1	110.2	63.5	103.9	152.4	50.8	40.9	25.4
Hankau	22.1	28.5	80.0	75.0	94.0	133.4	154.5	55.9	98.3	53.8	53.3	43.2
Ichang	10.2	30.0	29.4	73.7	69.7	59.7	116.8	92.3	70.9	58.2	17.3	30.4
Steep Island	45.5	41.8	40.3	65.9	48.5	57.2	73.8	44.0	55.4	54.9	40.2	30.3
Ningpo	38.2	38.1	44.5	38.1	43.0	94.3	114.4	88.9	127.0	129.5	51.8	26.3
Kiukiang	35.1	40.9	44.1	54.4	80.3	177.0	113.8	76.2	155.8	142.6	45.7	38.2
Chunking	6.8	10.2	23.4	81.3	71.7	74.5	99.5	81.0	54.9	35.1	23.9	14.0
Wenchow	43.2	54.1	33.5	42.0	44.5	95.2	148.6	81.3	61.2	73.8	44.5	30.4
Pagoda	40.7	52.1	38.1	53.1	97.7	94.0	70.7	77.5	108.2	24.4	50.5	28.4
Middledog	44.0	29.8	44.5	108.2	35.6	94.8	35.5	114.3	88.9	132.0	63.2	29.2
Tournabout	36.9	29.1	53.8	93.3	213.4	363.3	95.2	148.1	292.2	132.1	48.5	96.3
Ockseu	34.5	27.7	33.2	63.0	132.1	73.8	94.5	122.4	200.7	139.0	40.7	37.8
Amoy	23.1	81.9	61.7	45.7	118.1	115.3	122.0	102.0	102.0	101.0	49.3	27.2
Chapel Island	15.3	35.6	57.2	78.2	75.3	104.2	106.7	108.7	44.5	165.2	38.1	21.6
Wuchow	11.4	14.5	29.2	114.3	123.2	69.7	134.1	47.2	75.0	5.3	7.9	10.7
Swatow	30.2	91.2	80.0	169.9	252.3	166.4	118.5	68.9	124.8	114.3	55.3	20.6
Lamocks	30.5	24.6	29.0	55.9	270.7	85.1	159.5	162.6	72.4	85.8	54.3	28.0
Breakerpoint	43.0	38.1	21.1	67.3	360.2	137.2	170.2	208.3	127.0	219.3	120.5	42.4
Longchow	14.0	8.1	49.1	56.1	111.8	71.2	115.0	167.1	31.6	28.3	32.8	4.3
Hongkong	71.5	55.4	22.4	107.4	142.9	214.6	158.5	132.5	108.4	307.7	149.3	30.5
Macao	66.1	37.8	49.6	86.5	180.4	164.3	158.4	126.9	108.2	112.0	152.0	17.5
Waglan	22.9	50.8	27.5	43.3	102.4	136.7	55.9	150.0	50.8	79.5	40.6	8.9
Pakhoi	23.4	26.4	26.7	85.9	138.8	200.0	245.1	185.5	103.7	135.8	97.2	36.1

THE DEVELOPMENT OF METEOROLOGY IN AUSTRALIA.

By ANDREW NOBLE, Esq.

Dated Meteorological Branch, Sydney Observatory, Sydney, N. S. W., November 9, 1905.

The acting meteorologist of New South Wales, Mr. H. A. Hunt, recently received a letter from the Editor of the MONTHLY WEATHER REVIEW, asking that some one prepare for publication in that journal "a sketch of the development of meteorology in Australia." The following notes have been compiled in response to that request:[1]

It is necessary to explain at the outset that meteorology in Australia is still running under state auspices, and that the government astronomers at Sydney, Melbourne, Adelaide, and Perth, the hydraulic engineer at Brisbane, and the government meteorologist at Hobart are the recognized official heads of meteorology in their respective states. Only at Hobart, Brisbane, and Sydney is meteorology divorced from astronomy, and even in the case of Sydney the acting meteorologist still holds his position subject to the general control of the acting astronomer. Since this sketch practically emanates from the Sydney Observatory, New South Wales, the writer is placed somewhat at a disadvantage with regard to essential details bearing upon the progress of meteorology in the other Australian states. This fact should be emphasized in justice to the other states.

NEW SOUTH WALES.

Meteorological observations in Australia were probably first recorded systematically with reliable instruments at Sir Thomas Brisbane's private astronomical observatory, Paramatta, New South Wales, beginning in October, 1822, and continuing till March, 1824. Then occurs a break in the meteorological record at that observatory till the appointment (imperial) of Mr. Dunlop, who recommenced observations on January 1, 1832, and carried them on uninterruptedly till the year 1838. (See page 143, Rain, River, and Evaporation Results made in New South Wales during 1888.) In the meantime Captain King, during residence at Dunheved, New South Wales, from 1832 to 1839, and at Tahlee, New South Wales, up to 1848, kept a record of pressure, temperature, and hygrometric conditions, apparently giving much time, in collaboration with Mr. Dunlop, of Paramatta, to a study of the diurnal variation of pressure. Captain King was evidently a close student[2] of meteorology and did much to foster an interest in it during those early years. When the erection of the present Sydney Observatory was under contemplation he advised[3] the government as to where it should be placed. P. E. de Strzelecki, in his Physical Description of New South Wales and Van Diemens Land (London, 1845), draws extensively upon Captain King's observations for his discussion of the circulation of the winds round the coast of Australia. This work contains a valuable summary of the meteorological data available for the years 1838 to 1842, inclusive.

In April, 1840, the New South Wales government started three substations, viz, South Head (five miles east of Sydney), Port Macquarie, and Port Phillip (situated in what is now the state of Victoria). Educated convicts, who had been instructed by the astronomer at Paramatta, were placed in charge of these stations, and observations were carried on uninterruptedly, at South Head to 1855 and at Ports Macquarie and Phillip to 1850. In the meantime Capt. J. C. Wickham kept a record at Brisbane from 1840 to 1846, inclusive, the results being published in the Morton Bay Courier for January 23, 1847. Australian meteorology is greatly indebted to the Rev. W. B. Clarke for his untiring efforts in its behalf during those early years, beginning with his observations at Paramatta in the year 1839 and continuing long after the inauguration of the New South Wales service under government auspices in the year 1858. During this period Mr. Clarke read eighteen papers on meteorology before the local Royal Society and contributed a great many more to the daily papers. In the year 1842 alone he wrote twenty-one articles, covering a wide range of the subject, for the Sydney Morning Herald. From 1841 to 1847 he gave a large amount of time to the study of thunderstorms, and at his own expense established four observing stations in different parts of the colony for that purpose. The 19-year cycle theory, elaborated by Mr. Russell in more recent

[1] In communicating this most instructive article by Mr. Noble, Mr. H. A. Hunt, the acting meteorologist, writes:

"Prior to receiving your letter no record of the verifications or otherwise of the forecasts for New South Wales had been kept in this office. We were rather diffident about keeping such a record here, and thought it advisable to test the feeling of those who are supposed to use the forecasts. Accordingly we sent copies of a circular requesting figures, showing approximately the percentage of verification, to a number of gentlemen. As the notice was so short we did not get figures from all, but the replies were generally most encouraging. Hereunder is a table showing the results as received from certain towns in New South Wales:

Place.	Verified.	Verified partially.	Failure.
Carcoar	75	15	10
Glen Innes	85	10	5
Temora	60	30	10
Bundarra	90	5	5
Breadalbans	71	26	3
Inverell	85	10	5
George Street North Post-office, Sydney	70	20	10
Peak Hill	70	20	10
Yass	85	10	5
Cowra	80	15	5
Average result	77.1	16.1	6.8

[2] As a lieutenant, in 1817, he was sent to complete the surveys on the coast of New South Wales, being engaged in that work till 1822. During this time, we are told, he "gave much attention to the physical condition and climate of the various parts of the coast which he visited." See his Maritime Geography of Australia, read before the Philosophical Society of Australia on October 22, 1822, and reproduced in Baron Field's Geographical Memoirs; also his Narrative of a Survey of the Intertropical and Western Coasts of Australia (London, 1827).

[3] Votes and Proceedings, New South Wales, 1852.